

# Achieving and Maintaining Quality in HIV Care: Lessons Learned from Zambia

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**W**ITH AN INCREASING NUMBER OF patients seeking services and treatment for HIV, the need to achieve and maintain quality of care presents major challenges to HIV providers. Between 2004 and 2007, the Zambian Ministry of Health (MOH) initiated a rapid scale-up of delivery of antiretroviral therapy (ART) to HIV-positive people who were eligible for treatment based on World Health Organization (WHO) clinical staging and CD4 cell counts. During this time 105,000 patients were enrolled in HIV care, and 54,000 people were commenced on ART. An external audit performed 15 months after the program began showed inadequate health-worker practices (e.g., failing to start eligible patients on *Pneumocystis carinii* (*jiroveci*) pneumonia [PCP] prophylaxis, and not ordering the appropriate laboratory investigations according to national guidelines).<sup>1</sup> These errors needed to be corrected and health-worker performance improved in order to achieve improved quality of care in the face of rapid scale-up.

Quality of care is dependent upon multiple factors, including health-worker performance;

the attributes of the work environment; client behavior and/or receptiveness; and the provision of structure, space, and the necessary tools, equipment, and supplies to enable health workers to do their jobs.<sup>2</sup> To improve health-worker performance, the Centre for Infectious Disease Research in Zambia (CIDRZ) devised a quality assurance program based on these factors, which utilized multidimensional interventions including infrastructure development, training, mentoring, and continuous quality improvement. This chapter reports our experiences implementing this program in Lusaka, Zambia, and serves as a model for low- and middle-income countries seeking to provide patients with a high quality of care despite human resource shortages and increasing numbers of patients seeking care.

## BACKGROUND

Project HEART is an HIV care and treatment program funded by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and managed by the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF). Since 2001, EGPAF has been working with its partner organization, CIDRZ, which has

established 45 HIV care and treatment sites in four provinces. CIDRZ, with support from EGPAF, provides comprehensive, decentralized HIV treatment services in Zambia through engagement in the following activities: providing ART, improving and renovating infrastructure, providing essential laboratory equipment for diagnosis and monitoring, establishing referral and follow-up systems, training health-care providers, and strengthening health management information systems (HMIS) and supply logistics.

Zambia faces enormous challenges to enroll and maintain the 330,000 people who require treatment for HIV in longitudinal care.<sup>3</sup> The greatest challenges to providing quality care for such large numbers include a shortage of human resources, infrastructure and supply deficits, and inexperience with chronic care. According to the MOH, Zambia has 646 of the recommended 2,300 doctors, and 6,096 of the recommended 16,732 nurses—a deficit of 1,654 and 10,636, respectively.<sup>4</sup> The General Nursing Council recommends a nurse-to-patient ratio of 1:6; however, in many hospitals and clinics, the current nurse-to-patient ratio is 1:100, which results in increased workloads and compromised quality of care.<sup>4</sup> The demand for an increased number of trained professionals is unmet due to a lack of training institutes and lengthy training programs with few graduates. The current rate of graduation from nursing schools is between 400 and 600 nurses per year.<sup>4</sup> At this rate, assuming no attrition, it is estimated that recommended clinician-to-patient ratios and nurse-to-patient ratios will not be reached until 2045.<sup>4</sup> Attrition is defined as health-care workers leaving government service for various reasons, such as to work in the private sector or in other countries, to change careers, or due to death from HIV itself; from 2003 to 2004, mortality accounted for 38% of staff attrition in Zambia.<sup>5</sup>

## THEORETICAL FRAMEWORK FOR PERFORMANCE IMPROVEMENT

In the late 1960s, Avedis Donabedian, a renowned professor of public health, first introduced the concept of assessing quality of care through evaluating structure, process, and patient outcomes. Over the next few decades, this approach became a dominant and accepted paradigm for the evaluation of quality of care.<sup>6</sup> Donabedian asserted that *structure*, as in the facilities and staffing of a site, should be adequate in order to provide a high quality of care. *Process* assumes that if proper procedures are followed, improvements in health care will result. *Outcomes* assume that patients' current and future health is attributed to the health care provided, and that staff benefit as a consequence of providing that care.<sup>6</sup> His model provides a useful theoretical framework for the accreditation of health facilities and the development of performance appraisal methods. Yet it does not fully address the particular challenges faced by health-care workers in resource-limited settings, who may not benefit as a consequence of providing care and who may not be motivated to improve their performance. Good health-worker performance is essential for effective delivery of health services. Poor health-worker performance contributes to reduced use of health facilities and harmful health practices.<sup>2</sup> If health-care performance is inadequate, adherence to guidelines is poor and interventions are not implemented to prevent sickness and death.<sup>2</sup>

A number of cognitive and behavioral theories are used as a basis for understanding and changing health-worker practices. For instance, cognitive theory assumes that undesirable behavior is caused by lack of information.<sup>2</sup> Therefore, we disseminate information on evidence-based guidelines through formal trainings and by circulating written guidelines. However, we also recognize that training and the dissemination of written guidelines alone will not change behavior.<sup>2</sup> By disseminating written

guidelines and standard operating procedures, and conducting trainings and clinical update meetings, we clearly communicate our expectations to health-care workers.

Improving health-worker performance requires adapting to an individual's stage of change. Depending on their environment, personal experiences, and readiness to change, people progress through five distinct stages of change: precontemplation, contemplation, preparation, action, and maintenance.<sup>7</sup> An individual may cycle through these stages several times before maintaining change.<sup>7</sup> The behavioral change model advocates tailoring interventions to the recipient's specific stage of readiness.<sup>7</sup> In our setting, expectations and intervention designs differ based on how long sites have been operating; training and support are tailored to the level of staff experience and competence at a given site. Assuming that external stimuli can influence behavior, we use interventions such as placing reminders in patient files for health workers to see (e.g., "repeat CD4 cell count to assess treatment failure"). We model desired performance while providing clinical mentoring, and regularly measure performance and provide feedback on performance to each site.<sup>3</sup> Good performance is recognized by the provision of incentives and rewards.

Diffusion-of-innovation theory explains how social groups influence change among peers. This theory asserts that most individuals are initially reluctant to adopt new ideas. Their acceptance of change requires that they pass through several phases, including awareness, interest, evaluation, and trial.<sup>7</sup> Health-care workers' responses to innovation can be grouped according to the speed at which the individuals adopt innovation. Some individuals are innovators, while others are ambivalent or resist innovation, particularly if they do not see any personal benefit from doing so, have a general lack of motivation, or are burned out.<sup>7</sup> In

our twinning program, we use experienced leaders of successful sites (the "innovators") to influence staff at poorly performing health facilities to change their practices and improve their standards of care.

## QUALITY ASSURANCE TOOLS

Our quality assurance program employs a systematic approach to optimize health-worker performance through training, mentoring, and continuous quality improvement. Before implementing new sites, an assessment of structure and space is conducted so that all renovations are completed before services are commenced. Site-specific preparation first involves providing all the necessary medical equipment and supplies, and training medical staff. Information on drug toxicities, treatment failure, national guidelines, and treatment algorithms are disseminated to all clinics. Data forms guide health workers through history taking, review of symptoms, physical examinations, WHO staging, assessment, care planning, ordering of investigations, and follow-up. Detailed standard operating procedures and care algorithms guide clinicians through the management of complex conditions and drug toxicities. Thereafter, continuous training and mentoring are provided to all sites, with a designated nurse spending two days per week at the site providing ongoing mentoring and supportive supervision.

## PERFORMANCE MEASUREMENT AND FEEDBACK

The objective of the quality improvement program is to measure whether sites are providing adequate and appropriate care and treatment services in accordance with national guidelines.<sup>8</sup> To assess quality of care, indicators are selected that are relevant, measurable, and routinely available in the patient files or database. Initially developed for CIDRZ-supported sites, an electronic patient tracking

**Table 1. Sample Quarterly Performance Report**

Sites	Baseline CD4		Baseline height and weight		CD4 measured within 9 months of ART initiation		Active patients enrolled, eligible, and on ART	
	N	%	N	%	N	%	N	%
A	424	92.98	171	91.94	365	92.17	139	67.80
B	1128	91.41	567	93.87	196	91.16	422	66.46
C	1305	94.09	609	92.41	1674	98.47	498	77.57
D	939	91.79	359	69.98	872	93.76	392	76.12
E	1571	95.10	767	97.96	656	96.47	553	67.19
F	1207	94.82	536	95.71	1153	95.45	457	66.52
G	449	92.96	236	95.93	8	100.00	175	70.00
H	1007	92.64	433	93.32	1423	96.87	355	73.65
I	1222	87.54	500	86.21	1379	96.50	417	69.04
J	1860	80.66	908	94.58	2117	91.21	732	64.78
K	458	90.69	263	90.38	639	93.70	201	75.28
L	1627	82.80	1009	92.65	1659	91.51	876	79.35
M	722	86.05	319	94.66	855	93.54	241	60.25

system (SmartCare) has now been adopted as the national patient tracking system for HIV care and treatment programs throughout Zambia. Relevant demographic, laboratory, and clinical information on all patients enrolled in care and treatment programs, including those on ART, is entered into the system. The system is used to track patients, assess patient outcomes, and provide stakeholders with program information. Quality assurance reports (Table 1) provide information on the performance of each clinic, making it possible to monitor trends in performance based on certain quality indicators. Feedback is then provided to the clinics based on this information. Meetings are held to discuss each clinic's strengths and weaknesses and to formulate interventions to improve performance. Since

performance is measured every three months, sites can evaluate their performance—in individual areas and overall—compared with other clinics over time.

Some of the indicators that are routinely measured include the following:

- Percentage of patients who have received a baseline CD4 count
- Percentage of patients who have received a repeat CD4 count
- Percentage of patients who have received baseline liver and kidney function tests
- Percentage of patients on zidovudine who have had their hemoglobin measured
- Percentage of patients who have appropriately started PCP prophylaxis

- Percentage of patients who have been seen by a clinician in the past three months
- Percentage of patients who have been late for a clinic or pharmacy appointment

In addition to the performance reports, the patient tracking system generates reports on patients who have abnormal laboratory results that require clinical intervention and/or meet local criteria for immunological or clinical failure. These reports enable nurses and clinicians to perform targeted file reviews, order appropriate care, and identify trends in quality of care. Quarterly performance reports generated from the patient tracking system reflect not only the quality of patient care but also the quality of data entry. If there are discrepancies between a patient file and the electronic record, they are discussed at scheduled meetings. The purpose of these meetings is to explore issues and address problems that have been identified by SmartCare.

## RESULTS

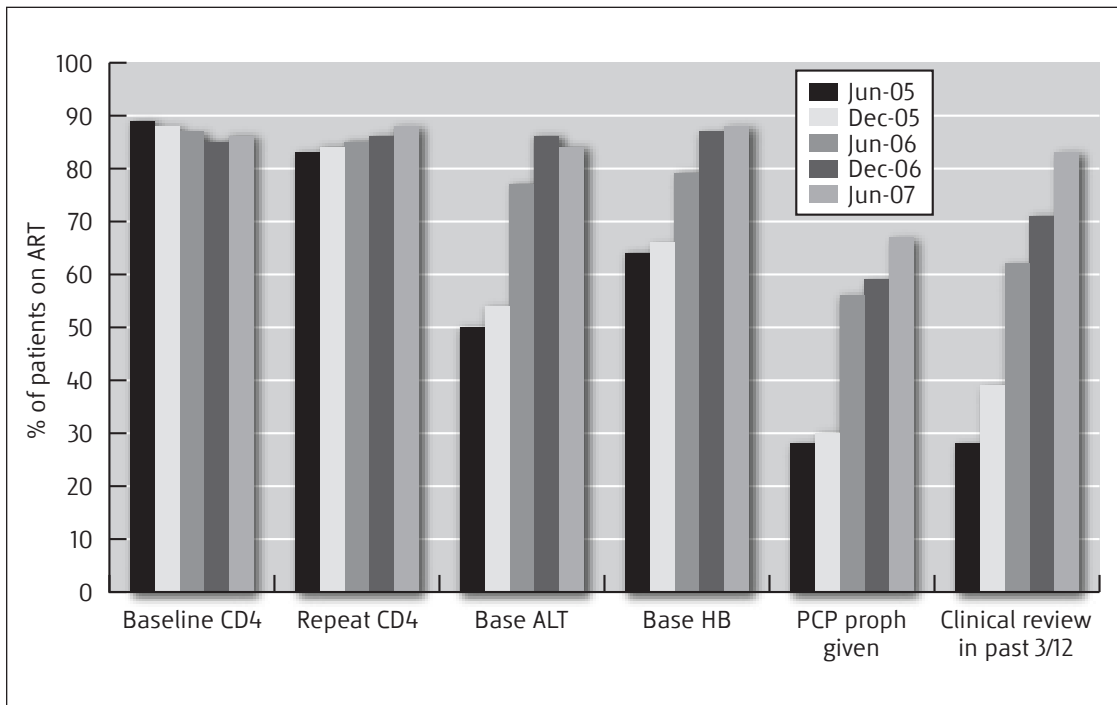
We reviewed performance reports generated by the patient tracking system to compare the performance of 14 Lusaka clinics based on quality-of-care indicators from June 2005 to June 2007. In June 2005, after 13 months of program implementation, Project HEART Zambia was operating at 18 sites in three provinces (Lusaka, Southern, and Western provinces). At this time, over 23,000 patients had been enrolled in HIV care and treatment, with 12,510 of those on ART. Performance on key indicators of quality care revealed that as of June 2005, 89% of patients had received a baseline CD4 count, 83% of patients had received a repeat CD4 count as per national guidelines, 62% of patients had a baseline hemoglobin measurement on file, 50% of patients had received baseline liver and kidney function tests, 28% of patients were appropriately on PCP prophylaxis, and 27% of patients had had a clinical visit in the past three months.

After 37 months of program implementation, in June 2007, Project HEART Zambia was operational at 39 sites in four provinces (Lusaka, Southern, Eastern, and Western provinces). More than 105,000 patients had been enrolled and 54,000 patients were on ART. Quarterly performance reports generated for the same 14 clinics in Lusaka during this period showed improvements in the majority of indicators: 85% of patients had received a baseline CD4 count, 88% of patients had received a repeat CD4 count, 89% of patients had a baseline hemoglobin measurement on file, 85% of patients had received baseline liver and kidney function tests, 67% of patients were appropriately on PCP prophylaxis, and 83% of patients had been seen by a clinician in the last three months (see Figure 1, next page).

## TRAINING AND CLINICAL MENTORING

Medical officers, nurses, and clinical officers attend basic trainings in adult and pediatric HIV care and treatment in addition to receiving training on behavior change and counseling. Thereafter, training is provided on an as-needed basis, with clinical updates provided annually to selected staff.

Clinical mentoring is conducted at various levels within the program. The role of the clinical mentor is to provide on-site, continuous, supportive mentoring to inexperienced clinicians and nurses to improve the quality of patient care. Experienced HIV clinicians from the United States and Canada provide clinical updates and train Zambian doctors, clinical officers, and experienced nurses to become clinical mentors. Clinical mentors are trained in the latest guidelines for ART and clinical mentorship. Mentors also attend weekly clinical update meetings, participate in online medical education sessions, and attend periodic national meetings to stay current on the evolving practice of



**Figure 1. Clinical care performance for 14 Lusaka district clinics in operation before June 2005**

Note: Graphs represent the percentage of patients on ART who met each specific quality-of-clinical-care indicator.

ALT = alanine aminotransferase, HB = hemoglobin

HIV care and treatment. Following completion of triage training and advanced training on care of the stable HIV patient, nurses are mentored for a three-month period to enable them to assess, examine, and provide care to clinically stable patients. In addition to clinical mentoring, nurses receive coaching in efficient clinic management, patient flow, and quality improvement. Clinical officers undergo intensive training in patient assessment, management, and documentation under supervision from experienced HIV doctors. This ongoing mentoring of nurses and clinical officers has improved overall clinic management and patient flow and has created a supportive atmosphere characterized by mutual respect and enhanced communication between different cadres of staff.

## BUILDING SUSTAINABLE SYSTEMS

Recently, each clinic has established a quality committee comprised of clinic staff and community members who actively address quality issues and concerns. At some district clinics, the quality committee has placed suggestion boxes in the waiting area to obtain anonymous feedback from clients on ways to improve services. Patient suggestions to improve care are discussed at monthly quality committee meetings, and changes are implemented when possible. Every morning, group education sessions led by peer educators (community members who are HIV-positive and trained in HIV counseling) address adherence issues at each clinic; topics covered range from how to manage missed clinic visits or skipped doses to family issues relating to HIV. All patients are encouraged to attend.

Exchange visits are conducted for nurses and clinicians between city and provincial sites to encourage positive peer social influence and build sustainability, ownership, and interest in continuous quality improvement. The sites that are performing well provide supportive supervision and mentoring to less experienced sites. Since the implementation of exchange visits, the quality of care in provincial and Lusaka sites has improved significantly. The provincial and district health offices are also responsible for assessing quality of care. Meetings are held at the designated clinics to review quality performance reports, which later are presented to the MOH. By providing feedback to clinics, the provincial and district health offices enhance collaboration, communication, and ownership of the quality improvement program.

## **STRATEGIES TO IMPROVE HEALTH-WORKER PERFORMANCE: CHALLENGES AND INTERVENTIONS**

### **Failure to Order Appropriate Laboratory Investigations and Assess Patients on Severity of Problems**

At program initiation, many clinicians were not ordering the appropriate laboratory investigations (e.g., baseline hemoglobin for patients starting zidovudine, baseline liver function tests, or repeat CD4 cell counts per national guidelines) or were failing to switch antiretroviral (ARV) drugs due to toxicities or treatment failure.<sup>1</sup> During our inquiries with the clinic staff, it became evident that nurses were not authorized to request or interpret laboratory investigations, failed to prioritize patients according to the severity of their problems, and lacked knowledge about drug toxicities and treatment failure. Once these shortcomings were identified, a triage training to address these factors was developed, which focuses on patient assessment and the management of urgent

problems, the recognition of toxicities and severe illness, and the interpretation of laboratory investigations. This training has enabled nurses to triage patients appropriately and to ensure that patients receive appropriate laboratory investigations and are reviewed in a timely manner by physicians.<sup>9</sup> After triage training, nurses undergo advanced training on care of stable HIV patients based on the WHO Integrated Management of Adult and Adolescent Illness (IMAI). This five-day training focuses on several components of clinical evaluation, including HIV disease staging, opportunistic infection prophylaxis and treatment, ART eligibility, and ARV drug toxicity and management. A key focus of the training is early recognition of signs and symptoms requiring referral to a tertiary-level facility.

### **Staff Shortages, Retention, and Motivation**

Recent statistics indicate that Zambia has an estimated seven doctors and 113 nurses per 100,000 people, which is less than one-third of the target number for doctors and less than one-half of the required nurses.<sup>3,5</sup> To address these shortages, and to motivate and retain health-care workers, we provide salary support, training, and continuing education opportunities.<sup>10</sup> In addition, health workers are provided with access to free, confidential health care, either on-site or at a designated clinic. Nevertheless, staff shortages, retention, and lack of motivation remain the greatest challenges to achieving and maintaining good quality of care. While the number of health-care workers remains deficient, the number of patients being enrolled and commencing ART continues to grow. To respond to the ever-increasing patient demand, we utilize task shifting, a process of delegating tasks from more specialized to less specialized health workers. This approach, which has been proposed by WHO and others as a possible short-term solution

to the dire human resource shortages in the health-care sector, has been effective in similar settings in Africa.<sup>11</sup> However, the ability to expand the role of lay and professional health-care workers is limited. As individuals take on more responsibilities, they need to receive appropriate recognition and incentives. While we offer overtime salary support, we realize that this is a short-term solution that does not address chronic staffing deficiencies.

### **Deficiencies in Provincial Laboratory Capacity**

Despite multiple trainings in laboratory capacity building, the ability to maintain a consistent supply of reagents and ensure the proper functioning of laboratory equipment remains elusive. A combination of poor logistics and supply forecasting, coupled with lack of experience in maintaining equipment and staff de-motivation, have contributed to the laboratory capacity deficiencies. To address this problem, we are enlisting teams that work closely with provincial sites to build capacity for equipment maintenance. We are also considering novel ideas for performance-based financing, in which staff are paid for each test completed.

### **Limited Site Capacity**

A number of sites are already operating at maximum capacity, which creates a significant strain on staff working in a limited space. Filing systems have become disorganized, consulting rooms are crowded, waiting lines are long, and staff are tired. To address these challenges, we have constructed temporary walls and filing shelves to increase the number of consulting rooms and provide additional filing space. In some clinics, we have instituted a system of preparing files the previous day for the next day's appointments. We have lengthened the

time between follow-up appointments for stable patients who are now managed by nurses. We are exploring the possibility of instituting mobile clinics, where trained clinicians and other staff from district health clinics regularly visit health posts to provide clinical care and mentoring to health post staff. This will enable staff at health posts to manage stable patients, thereby off-loading significant numbers of patients from clinics that have exceeded their capacity. This approach has been tried in a number of settings, with reported success.<sup>13</sup>

### **KEY POINTS SUMMARY**

- The quality of health care depends on multiple factors, including patient and health-worker behavior, as well as workplace and environmental factors.
- In order to improve the quality of care, we have implemented a number of multifaceted interventions that addressed a variety of shortcomings.
- Quality of care is monitored at regular intervals, deficiencies are identified, feedback is provided to each site, and appropriate interventions are developed to improve performance; then the cycle is repeated.
- Continuous training, mentoring, and communication are essential for high-quality performance.
- Written guidelines and job aids are needed to support both experienced and inexperienced health-care workers.
- Improving health-worker performance is dependent not only on education and clinical mentoring, but also on regular performance measurement and feedback; emphasis should be placed on understanding and addressing conditions that support staff motivation and retention.

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